C. Sand-Bituminous Stabilized Base Course Pre-Mixed

Sand-Bituminous Stabilized Base Course, complete in place and accepted, will be paid for at the Contract Unit Price per ton (megagram) or per square yard (meter), which shall be full compensation for preparation of the roadbed, for all materials except bituminous materials, and for loading, unloading, all hauling, mixing, spreading, watering, rolling, shaping, and maintenance.

D. Bituminous Material

The number of gallons (liters) of bituminous material, except bituminous material in excess of the 5% tolerance and except that used as Bituminous Prime, will be paid at the Contract Unit Price per gallon (liter), complete and in place.

Payment is full compensation for providing bituminous material, hauling, heating, and applying the material.

E. Unsuitable Material

Removal of unsuitable material will be paid for according to the Earthwork Item in the Contract.

Payment will be made under:

Item No. 302	Sand-bituminous stabilized base course material, including material and haul	per cubic yard (meter)
Item No. 302	Sand-bituminous stabilized base course material, including haul	per cubic yard (meter)
Item No. 302	Sand-bituminous stabilized base course, ___ inch (mm)	per square yard (meter)
Item No. 302	Pre-mixed sand-bituminous stabilized base course, including material	per ton (megagram) or per square yard (meter)
Item No. 302	Bituminous materials	per gallon (liter)

302.5.01 Adjustments

General Provisions 101 through 150.

Section 303—Topsoil, Sand-Clay, or Chert Construction

303.1 General Description

This work includes constructing a base, subbase, or shoulder course using topsoil, sand-clay, or chert, stabilized with aggregate, where required.

Construct according to these Specifications and to the lines, grades, and typical cross-sections shown on the Plans or established by the Engineer.

All of the provisions of Section 300 apply to this Item.

303.1.01 Definitions

General Provisions 101 through 150.

303.1.02 Related References

A. Standard Specifications

Section 106—Control of MaterialsSection 202—Random Clearing and Grubbing

Section 205—Roadway Excavation

Section 206—Borrow Excavation

Section 300—General Specifications for Base and Subbase Courses

Section 412— Bituminous Prime

Section 803—Stabilizer Aggregate

Section 814—Soil Base Materials

Section 821—Cutback Asphalt

Section 823 – Cutback Asphalt Emulsion

B. Referenced Documents

AASHTO T 99 and 191

GDT 21

GDT 59

GDT 67

303.1.03 Submittals

General Provisions 101 through 150.

303.2 Materials

Ensure that materials meet the requirements of the following Specifications:

Material	Section
Topsoil or Sand-Clay	814.2.01
Stabilizer Aggregates (Type as Specified)	803
Chert	814.2.04
Cutback Asphalt, RC-30, RC-70, RC-250 or MC-30, MC-70, MC-250	821.2.01
Cutback Asphalt Emulsion, CBAE-2	823.2.01
Blotter Material (Sand)	412.3.05.G.3

If an ingredient needs to be added to those naturally present in the roadbed or in any approved source of base, subbase, or shoulder material, obtain it from sources approved by the Engineer. Select sources according to the guidelines of Section 106.

303.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

303.3 Construction Requirements

303.3.01 Personnel

General Provisions 101 through 150.

303.3.02 Equipment

Provide equipment in satisfactory condition for proper construction. Use any applicable equipment specified in Subsection 412.3.02, “Equipment” for bituminous prime.

303.3.03 Preparation

If creating the base, subbase, or shoulder construction entirely with new materials, prepare the subgrade or subbase as specified in Subsection 300.3.03.C, “Preparing the Subgrade” or Subsection 300.3.03.D, “Preparing the Subbase”. Do not place base materials on muddy or frozen subgrade or subbase.

303.3.04 Fabrication

General Provisions 101 through 150.

303.3.05 Construction

A. Roadbed Materials

If the Engineer determines roadbed materials are unsuitable for use, remove and replace them with approved new materials.

If the Engineer determines that roadbed materials are satisfactory, mix, shape, and finish them according to the Specifications.

B. Placing Material

Mix and control the materials according to Subsection 300.3.05.B, “Mining and Mixing in a Pit.” Handle and place materials carefully to prevent fine and coarse materials from separating.

If placing only one kind of material on the prepared subgrade or subbase, or adding only one kind of material to the roadbed to obtain the required mixture, place the material directly on the prepared roadbed and distribute uniformly.

If mixing together materials from more than one outside source, spread them in separate layers to the proper depth. Do this for each separate course, if placing the base in more than one course.

If creating topsoil or sand-clay from artificial mixtures, place the proper proportions of the required ingredients on the roadbed and distribute uniformly.

Use the following steps to spread, mix, and stabilize a base, subbase, or shoulder course.

1. Spreading

   Spread material lengthwise up to 2,500 ft (750 m) on the roadbed. If the material is too wet to mix, place additional material as the Engineer requires. Mix as soon as the moisture content reaches the proper level.

2. Mixing

   Mix the material by one of the following methods, weather and moisture conditions permitting:

   a. Plowing, Harrowing, and Blading

      Without disturbing the underlying subgrade or subbase, plow the material to its full depth, then harrow with a disc harrow. Begin plowing both at the edges and the center, alternating back and forth as many times as necessary, to produce a thoroughly pulverized and homogeneous mixture.

   b. Traveling Plant

      A traveling plant mixer may be used instead of the method described above.

3. Stabilizing

   After mixing and shaping the base, subbase, or shoulder course, spread stabilizer aggregate, if specified in the Contract or the Plans.

   The quantity of stabilizer material required will be specified in pounds/square yard (kilograms/square meter) of road surface covered. The Department reserves the right to increase, decrease, or eliminate stabilizer material.

   Spread and mix stabilizer aggregate with either the upper 4 in (100 mm) or to the full depth of the course, as the Plans indicate. Uniformly incorporate the stabilizer aggregate into the course. Remix and reshape all sections of the course as needed.

   When using stabilized subgrade as a base course, either permanently or temporarily (for example, as detours), prime according to Section 412.

C. Compacting and Finishing

Use the following steps to compact and finish a base, subbase, or shoulder course.

1. Moisture Content

   Ensure that the moisture content is uniformly distributed and within 90 to 120 percent of optimum. The Engineer will determine the percentage within this range that is appropriate for each job.

2. Compaction

   If the base, subbase, or shoulder course is more than 8 in (200 mm) thick, compact it in two courses of equal thickness.

   After placing and mixing the material, roll it until the course is uniformly compacted to 100 percent of the maximum dry density.

   Complete all courses of any section of construction started in the same day, weather permitting.

   a. Single-Course Construction

      1) Compact the surface by rolling, beginning at least 2 ft (600 mm) outside of its edges.

      2) Proceed toward the center until the finished surface is smooth, closely knit, and conforms to the proper line, grade, and cross-section.

      3) Correct any defects according to Subsection 300.3.06.B, “Repairing Defects.”

   b. Multiple-Course Construction

      1) After compacting the first course, shape the surface again to line, grade, and cross- section.

      2) Add water as necessary to develop the proper moisture content.

      3) Spread and compact the second and any succeeding courses (including stabilizer aggregate, if required) without rolling the first course again.

4) Finish the surface according to the procedure specified for Subsection 303.3.05.C.2.a, "Single-Course Construction."

c. Irregular Areas

In places inaccessible to the roller, obtain the required compaction with mechanical tampers approved by the Engineer. Apply the same density requirements as stated above.

D. Protecting the Base, Subbase, or Shoulders

Maintain the course true to grade and cross- section. Until the course cures to the Engineer's satisfaction, keep it free from ruts, ridges, and dust caused by traffic. Roll and add water as needed and repair defects as soon as they appear, as specified in Subsection 300.3.06.B, "Repairing Defects."

E. Priming the Base

After completing the base, apply Bituminous Prime according to Section 412.

If the base is primed before base material classification test results are known, repair and reprime any resulting defective areas at no additional cost to the Department.

303.3.06 Quality Acceptance

A. Compaction Tests

a. The maximum dry density will be determined from representative samples of compacted material, according to GDT 67 or AASHTO T 99, Method D, where applicable.

b. The Engineer will determine the in-place density of finished courses according to AASHTOT 191, GDT59, or GDT 21 , where applicable.

B. Finished Surface

a. Check the finished surface of the base, subbase, or shoulder course transversely. Check the surface by placing a 15 ft (4.5 m) straightedge perpendicular to the centerline, and also by using one of the following tools:

- A template, cut true to the required cross section and set with a spirit level on non-superelevated sections
- A system of ordinates, measured from a stringline
- A surveyor's level

b. Ensure that ordinates measured from the bottom of the template, stringline, or straightedge to the surface do not exceed 1/2 in (13 mm) at any point. Rod readings shall not deviate more than 0.04 foot (13 mm) from the required readings.

c. Correct any variations that exceed the requirements immediately, as specified in Subsection 300.3.06.B, "Repairing Defects."

C. Thickness Tolerances

1. Thickness Measurements

a. Thickness requirements apply to shoulder construction where the Plans specify a uniform thickness, or where the shoulders will be surfaced.

b. Determine the thickness of the base, subbase, or shoulder course, by making as many checks as necessary to determine the average thickness.

2. Deficient Thickness

a. If any measurement is deficient in thickness more than 1/2 in (13 mm), make additional measurements to determine the deficient area.

b. Correct any area deficient between 1/2 in (13 mm) and 1 in (25 mm) to the design thickness by using one of the following methods according to these Specifications:

- Add additional quantities of the same materials and reconstruct to the required thickness
- Leave in place and accept payment for the materials and area (if the course is mixed in place) at ½ the Contract Unit Price for the deficient area.

c. Correct any area deficient in thickness by more than 1 inch (25 mm) by adding additional quantities of the same material and reconstructing to the required thickness in accordance with these Specifications.

d. If payment is made by the cubic yard (meter), payment for additional material to correct deficiencies will be made at the Contract Unit Price with no additional cost to the Department for scarification, mixing or compaction.

e. If payment is made by the square yard (meter), no payment will be made for additional material required to correct deficiencies or reconstructing deficient work.

3. Average Thickness

a. The average thickness per linear mile (kilometer) is determined from all measurements within the mile (kilometer) increments except the areas deficient by more than 1/2 in (13 mm) and not corrected.

b. The average thickness shall not exceed the specified thickness by more than 1/2 in (13 mm).

c. If the basis of payment is per cubic yard (meter) for base, subbase, or shoulder, and the average thickness for any mile (kilometer) increment exceeds the allowable 1/2 in (13 mm) tolerance, the excess quantity in that increment will be deducted from the Contractor's payments.

d. The excess quantity is calculated by multiplying the average thickness that exceeds the allowable 1/2 in (13 mm) tolerance by the surface area of the base, subbase, or shoulder, as applicable.

e. If the basis of payment is per square yard (meter), no deduction will be made for excess thickness.

303.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

303.4 Measurement

A. Topsoil, Sand-Clay, or Chert

Topsoil, sand-clay, or chert is measured by the cubic yard (meter) loose volume, or by the square yard (meter), as specified in Section 109.

B. Stabilizer Aggregate

Stabilizer aggregate is measured by the ton (megagram). Its weight is determined by certified truck scales on the job, or by another certified scale approved in advance by the Engineer.

C. Prime

Bituminous prime is not measured for separate payment.

D. Clearing and Grubbing

When clearing and grubbing is eligible for payment under the provisions of Subsection 106.10, "Local Materials Sources," it is measured by the acre (hectare).

E. Stripping Excavation

When stripping excavation is eligible for payment under the provisions of Section 206 it will be measured using the average end area method as borrow excavation, including material, by the cubic yard (meter).

F. Removing Unsuitable Materials

Unsuitable materials removed are measured and paid for under the Earthwork Item in the Contract.

G. Blending and Remixing

Blending and remixing will be measured by the square yard (meter) as measured on the longitudinal surface, and to the width specified.

303.4.01 Limits

General Provisions 101 through 150.

303.5 Payment

A. Topsoil, Sand-Clay or Chert Base, Subbase, and Shoulder Course

This course will be paid at the Contract Unit Price per cubic yard (meter) or per square yard (meter) as specified for base, subbase, and shoulders, complete, in place, and accepted.

Payment is full compensation for:

- Preparing the roadbed
- Furnishing materials when specified in the Pay Item
- Loading and unloading
- Scarifying, spreading, plowing and harrowing
- Mixing and blending in the pit, in the plant, and in the roadway
- Rolling and shaping
- Watering, maintaining, hauling, and priming

B. Stabilizer Aggregate

Stabilizer aggregate will be paid at the Contract Unit Price per ton (megagram) complete, in place, and accepted. Payment will be full compensation for furnishing materials, loading, hauling, unloading, handling, spreading, scarifying, mixing, watering, shaping, and maintenance.

C. Clearing and Grubbing

Clearing and grubbing eligible for payment under the provisions of Subsection 106.10, "Local Material Sources," will be paid according to Section 202.

D. Stripping Excavation

Stripping excavation eligible for payment under the provisions of Section 206 will be paid according to the same section. Payment will be full compensation for the removal of all materials unsuitable for use in the base, subbase, or shoulder.

E. Priming

Bituminous prime will not be measured for separate payment. Its cost is included in the price bid for base.

Payment will be made under:

Item No. 303	Topsoil, sand-clay, or chert (base, subbase, shoulder) course, class ___ including material	Per cubic yard (meter) or square yard (meter)
Item No. 303	Topsoil, sand-clay, or chert (base, subbase, shoulder) course, class___	Per cubic yard (meter) or square yard (meter)
Item No. 303	Topsoil, sand-clay, or chert (base and shoulder) course, class ___ including material	Per cubic yard (meter) or square yard (meter)
Item No. 303	Topsoil, sand-clay, or chert (base and shoulder) course, class ___	Per cubic yard (meter) or square yard (meter)
Item No. 303	Stabilizer aggregate, type___ including material	Per ton (megagram)

303.5.01 Adjustments

General Provisions 101 through 150.

Section 304—Soil Aggregate Construction

304.1 General Description

This work includes constructing base, subbase, or shoulder courses composed of mineral aggregate and soil mortar on prepared subgrade or subbase. Construct according to these Specifications and to the lines, grades, thickness, and cross-sections shown on the Plans or established by the Engineer.

All of the provisions of Section 300 apply to this work.

304.1.01 Definitions

General Provisions 101 through 150.